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The invention relates to a method for cleaning small ones

articles, like dish, glasses, cutleries u.dgl., and an apparatus with a cabinet-like, front by means of a door lockable apparatus bodies also in its interior arranged mounting plates, inertial baskets, Gefachen u.dgl. to the receptacle of the good one and with a flushing system for the execution of this method, swirling which can be cleaned, the cleaning water in the housing interior.

Apparatuses to coils and cleaning in particular dishes are in the most diverse embodiments for household and commercial purposes known. This Gespirrspülreinigungseinrichtungen are a common cabinet-like apparatus body with spray means for with cleaning agents offset waters, arranged in its interior, and with the good which can be cleaned female baskets, Tassenetageren, Gefachen u.dgl. The spray means are as in or multi-armed rotary spray arm formed and effective in more than two sprayingplanar. For coils and cleaning dishes used waters heated and with chemical cleaning agents offset becomes on for instance 70t.

Over particularly strong contaminated dishes too rei--igen, the good which can be cleaned Vorwä are subjected, so that only becomes made in the second step the actual cleaning of the dish. The cleaning stages one clear rinsing stage follows then at least. The known table-ware flushing systems are provided with a full mechanism, it the possible, required in each case rinse program to pre-programme and then run off let.

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Numerous embodiments of table-ware flushing systems are provided with water softening mechanisms.

Disadvantageous one with these known table-ware flushing systems is the circumstance that during the cleaning operation the used cleaning water becomes through of the good one which

can be cleaned ablated dirt particle enriched, so that each water admission becomes conducted on the good with a water, which can be cleaned, which enriches itself to the end of the cleaning operation ever more with dirt particles and contaminants, so that always the cleaning operation a clear rinsing procedure must follow. In addition it comes that after termination of the rinsing procedure the cleaning and rinsing water unaufgearbeitet the sewer supplied become and thus to an environmental pollution contribute. The expiration temperature does not lie over 400C waste water-laterally allowable Temperatur.Dadurch that heated cleaning water for the execution of the rinsing procedure becomes used, is possibility of an energy saving given, because the known table-ware flushing systems permit the use from cold water in no way to cleaning purposes. The cleaning of dishes becomes not only alone by used waters offset with cleaning agents the conducted, but additional assisted by the cleaning water turbulence in the interior of the apparatus body, so that at the good one adherent dirt which can be cleaned particles are hydroextracted by pressure water admission by their ground. In addition it is disadvantageous that with the known table-ware flushing systems the cleaning operation lasts about 90 minutes and also more. Nevertheless such table-ware flushing systems become also for commercial purposes, like e.g.

in restaurants, hotel, restaurant od.dgl. used, in which actual table-ware flushing systems are required, which do not only exhibit a higher photograph capacity of the good one which can be cleaned, but for the cleaning operation also cure zere. Unit times need. In order to reach this, special cleaning agents the washing water added and with still higher temperatures are worked, so that such table-ware flushing systems with an high energy consumption work. In addition is all known table-ware flushing systems common that for a cleaning operation used waters in no more way is more useful, but after each rinsing procedure the water derived becomes. In addition it comes still that with the use of aufgehezitem cleaning water no germ killing made.

In contrast to this it is object of the instant invention, a cleaning method, in particular for dishes to create with in each phase of the cleaning operation of w#schaktives, conditioned, i.e. from dirt particles cleaned and germ-free cleaning water is available and energy-saving without reduction of the cleaning effect pollution free and with short wash times works.

To the solution of this object a method is swirled for cleaning small articles, like dish, glasses, cutleries u.dgl., proposed cold cleaning water and ozonosphere in a circuit bottom exclusion of an heat input continuous supplied, in the cleaning area the cleaning water and ozonosphere mechanical, loaded offset after that a closed cleaning area with an emulsifying agent and aqueous hydrogen bromide acidic or bromide solution, with bromide and the Reinigungswaaser during rotating to the maintenance of predetermined amounts at bromide and oxygen hydrobromic acid or bromide solution and oxygen supplied becomes according to invention.

To the solution of the object the invention furthermore an apparatus sees arranged mounting plates, inertial baskets, Gefachen to lockable apparatus bodies for cleaning small articles, like dish, Gläster, cutleries od.dgl., with a cabinet-like, front by means of a door also in its interior u. dgl. to the receptacle of the good one and with spray means, swirling which can be cleaned, the

cleaning water in the housing interior forwards, which are according to invention in the way formed that the apparatus body with an ozone production mechanism with a prechamber, separate of the housing interior, is for metering hydrobromic acid or bromide solution and emulsifying agent mistake, whereby the ozone production mechanism is provided with cleaning water a zulaufleitung over a feed line for the conditioned Wasser'mit of the spray means in the interior of the housing connected and, which flows into a formed cleaning water collecting area bottom in the housing interior and exhibits a circulating pump.

With this method and the for this formed apparatus cleaning is of small articles, in particular dishes, glasses and cutleries, in energy-saving way possible. Surprising one was found that also strong contaminated dish in table-ware flushing systems derived using an addition of bromide and oxygen, from the supplied ozonosphere, in shortest unit time cleaned becomes. The improvement of the cleaning effect the cleaning water an actual known emulsifying agent becomes added. In addition it comes that becomes used in each cleaning phase of the actual washing operation always clean Reinigungswaaser, since the supplied cold cleaning water of a cycle supply is subjected to the good one which can be cleaned and regenerates themselves with passes of the ozone production mechanism again cleaning. For the execution of cleaning operations no heat input becomes required; the cleaning operation becomes with cold, with oxygen and bromine loaded water conducted, whereby each single cleaning operation is energy-saving. Since the used cleaning water becomes continuous cleaned during the circulation, the possibility of given washing operations several with a single amount at cleaning water is to be accomplished, which leads to a water saving and an environmental improvement, since no waste water arrives into the starting from water. Since no heated Reinigungswaaser becomes used, also subject-matters from a thermallabile material are easy waschbar. A rinsing procedure is not required with application of the new method; only an arising water loss is to be adjusted. The cleaning water is in a continuous circulation and becomes with the passage by the ozonization mechanism again in each case with oxygen loaded, so that the predetermined in each case amount of oxygen becomes constant maintained. In same way made also the addition of an aqueous hydrobromic acid or bromide solution, becomes added by which the water bromide. The presence of bromide excludes the presence from ozonospheres in the cleaning water. Excess ozonosphere becomes bottom simultaneous formation of oxygen-active bromine reduced. The active oxygen resultant by cleavage of the ozonosphere accomplishes quasi a “combustion” of the dirt particles adherent at the good one which can be cleaned, i.e. organic and inorganic substances, which are contained in the contamination, become burnt by oxidation. The bromine which is in the cleaning water serves as transport means for atomic-active oxygen, so that cleaning dishes always germ-free water becomes used.

Furthermore the invention sees itself the use of in a circuit led, with oxygen and bromide to loaded, cold and swirled, as well as mechanical in a cleaning area cleaning water for cleaning small articles, how Dish, glasses, cutleries u.dgl. bottom exclusion of heat input in table-ware flushing systems for increase of the cleaning effect with simultaneous reduction of the wash time forwards. To purposes of the cleaning used and waters loaded with ozonospheres is after an other feature of the invention with bromide loaded. In addition the cleaning water an

emulsifying agent resistant opposite active oxygen can be added.

In the drawing an apparatus is schematically illustrated for cleaning small articles, like dish, glasses, cutleries u.dgl..

The cleaning apparatus consists of a box shaped apparatus body 10, whose interior is indicated with 11.

Bottom one is in the interior 11 of the apparatus body 10 a cleaning water collecting area 12 with in the drawing not represented float and valve a provided. In this space 12 the cleaning water in ~Innenraum the 11 of the apparatus body 10 collects itself and becomes 12 then withdrawn of this space. So that the liquid level of the liquid a constant height finding in the plenum 12 maintains itself, this float is provided to the control, which stands in such a manner with a valve in active compound that with wastes of the liquid level of vorgegebe: Height of the bottom predetermined target mark the valve opened will flow and to so much fresh water the plenum 12 can, until the set value is achieved.

The cleaning water collecting area 12 of the apparatus body 10 stands with a cleaning water departure line 13 in connection, which flows into a separate ozone production mechanism 20 intended at the apparatus body 10. The ozone production mechanism is in actual known way formed. The ozone production mechanism 20 a prechamber 21 is placed in front, in the emulsifying agent and an hydrobromic acid or a bromide solution meter will. Furthermore in the departure line 13 a circulating pump is 35 arranged, over which the cleaning water becomes continuous from the plenum 12 withdrawn and by the ozone production mechanism 20 into a derivative 25 pressed subsequent to this mechanism, which serves 20 for the supply in the ozone production mechanism of the water conditioned for the spray means 30 arranged in the interior 11 of the apparatus body 10. In this way the cleaning water in the circuit becomes by the cleaning area of the apparatus body 10 passed, in in actual known way mounting plates, inertial baskets, Gefache u.dgl. to the receptacle of the good one which can be cleaned provided are. The spray means 30 are likewise in actual known way formed and in such a manner in the interior 11 of the apparatus body 10 arranged that the supplied cleaning water in the interior 11 is swirled. For this also several spray arms can become as spray means 30 used, those etagenförmig in the interior 11 of the apparatus body 10 arranged and over swivel axles of drivable sxnndo sin###q##ss#eijie optimum which Serb up beat is in the interior 11 of the apparatus body 10 finding good ones ensured. By redox-sensory detection of the water quality, which is in the drawing with 50 indicated, exists the possibility, the water treatment plant, i.e. the supply ~von bromide and ozonosphere to steer whereby bottom redox to the germ keimtötung and combustion, i.e.

oxidizing dirt particles, at the measurement cell for the order standing oxygen activity understood becomes. For this redox-sensory detection is e.g. at the apparatus body 10 in actual known way formed redox measuring means provided. with reaching the highest redox value for

switching the washing operation off to be consulted can.

As in the drawing the illustrated apparatus shows, the cleaning water in a circuit becomes again by the interior with the good one guided which can be cleaned and with passes of the ozone production mechanism 20 with ozonospheres loaded, so that the predetermined in each case redox potential can be kept.

Surprisingly it has itself shown that formed an in such a manner according to invention and working apparatus is suitable with best success for the cleaning of Haushaltsger hirr with unheated water. The grease adherent at the table-ware parts by those the cleaning water added emulsifying agents to degradable forms oxidizable in aqueous phase one leads up. Afterwards the made cleaning of the dish synchronous with the treatment of the fat-loaded water. The cleaning apparatus works as follows: The Wasservorlage is available with beginnings of the cleaning process with a redox potential of 700 mVs.

The loading of the scrubber amounts to for example 10 normal covers. Dependent one of the type of the pollution drops the Rx-value over up to 300 mVs within fewer minutes and becomes in other 15 minutes again the outputhigh constructed.

Thus the made cleaning of the inserted dish within only 20 minutes opposite 70 and more minutes in an heated dishwasher. Since up to Rückspülund auxiliary quantities also the store of water obtained remains, also water becomes saved with the apparatus beside energy.

For a washing water approach appended example becomes given: In a weight ratio of 1:500 (2 kg to 1.000 1 water) calcined soda (Na2CO3) as emulsifying agent of the Wasservorlage added. As the highest attainable redox potential provided itself Rx = 670 mVs. The addition of bromine made in the form of 10 ml HBr 46%. During the cleaning (25 minutes) the redox potential only light one decreased/went back (- 55 mVs) and remained after 10 minutes stable with 670 mVs.

As emulsifying agent actual known preferably not foaming emulsifying agents become used, which are preferably not more degradable by ozonospheres. The addition of the emulsifying agent to the cleaning water made preferably together with the addition of the bromide.

The supply of ozonosphere made favourable-proves in the sucking in range of the used circulating pump, so that the cleaning water does not contain ozonosphere, but only active oxygen.